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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/531,780	04/19/2005	Thomas Schafer	EL/2-22773/A/PCT	6057

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EXAMINER
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YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
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1786

NOTIFICATION DATE	DELIVERY MODE
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08/11/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/531,780	<b>Applicant(s)</b> SCHAFFER ET AL.	
	<b>Examiner</b> Marie R. Yamnitzky	<b>Art Unit</b> 1786	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 46-53 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 46-53 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

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1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's amendment filed on June 04, 2010, which amends claims 46-48 and 50-53, and cancels claims 54-62, has been entered.

Claims 46-53 are pending.

2. The rejection of claims 46-62 under 35 U.S.C. 112, 2<sup>nd</sup> paragraph, as set forth in the previous Office action (notification date: January 07, 2010) is partly rendered moot by claim cancellation and otherwise overcome by claim amendment.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 46-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakon et al. (US 5,077,142) in view of Schomaker et al. in *J. Org. Chem.*, Vol. 66, pp. 7125-7128 (2001).

Sakon et al. disclose compounds of the general formula (B')<sub>m</sub>-(Ar)<sub>n</sub> for use in an organic compound layer of an electroluminescent device comprising one or more organic compound

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layers sandwiched between an anode and a cathode. B' may be pyrimidine and Ar may be benzene, biphenyl, methoxybenzene or naphthalene. See, for example, column 2, line 21-c. 6, l. 45. Pyrimidine compounds having three aryl group substituents as within the scope of formula (I) as required for the device of present independent claim 46 are within the scope of Sakon's general formula.

Sakon et al. provide a specific example of a pyrimidine compound having four phenyl groups as substituents (see the compound represented by formula 146 in columns 67-68). Sakon's compound of formula 146 is a compound of Sakon's general formula wherein B' is pyrimidine, Ar is benzene, m is 1 and n is 4. Pyrimidine compounds within the scope of formula (I) having three aryl group substituents per the present claims would have been obvious to one of ordinary skill in the art at the time of the invention given Sakon's definitions of B', Ar, m and n, Sakon's compound of formula 146 and Sakon's compounds such as those of formulae 9 and 10 in columns 15-16 and formula 148 in columns 67-68. Sakon's compound of formula 10 is a compound in which B' is a benzene ring, m is 1, n is 4, and the four Ar groups are in the same pattern on the benzene ring as on the pyrimidine ring in the compound of formula 146. Sakon's compound of formula 9 is a compound in which B' is a benzene ring, m is 1, n is 3, and the three Ar groups are in the same pattern as provided by W, X and Y in present formula (I). Sakon's compound of formula 148 is a compound in which B' is a triazine ring, m is 1, n is 3, and the three Ar groups are in the same pattern as provided by W, X and Y in present formula (I). It would have been an obvious modification to one of ordinary skill in the art at the time of the invention to make pyrimidine compounds of Sakon's general formula in which B' is pyrimidine,

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m is 1, and n is 3. There are only three possible substitution patterns for such a substituted pyrimidine, and one of ordinary skill in the art at the time of the invention would have reasonably expected that a 2,4,6-Ar-substituted pyrimidine would be light-emissive and could be used for Sakon's purposes. Further, one of ordinary skill in the art at the time of the present invention, having knowledge of Sakon's disclosure, and having knowledge of the teachings of Schomaker et al. regarding methods of providing 2,4,6-aryl-substituted pyrimidines, would have been able to make 2,4,6-Ar-substituted pyrimidines within Sakon's general formula. A 2,4,6-Ar-substituted pyrimidine within the scope of Sakon's general formula wherein Ar is biphenyl (one of the four possibilities for Ar as recited at c. 2, l. 63-64 of Sakon's patent) is within the scope of present formula (I) as defined in claim 46, and also meet the limitations of the compound as required for the device of claims 47-53.

With respect to the device structure recited in claim 46, and the requirement that the electron transporting layer comprise the compound of formula (I), Sakon's electroluminescent devices have at least a luminescent layer sandwiched between an anode and a cathode. The luminescent layer comprises a compound of Sakon's general formula  $(B')_m-(Ar)_n$ . The device may further comprise a separate hole transporting layer between the anode and the luminescent layer, and/or a separate electron transporting layer between the cathode and the luminescent layer. The luminescent layer itself may also function as an electron transporting layer and/or hole transporting layer. For example, see Fig. 1, Fig. 2, Fig. 3, column 2, lines 21-40, c. 77, l. 18-47, and c. 78, l. 52-c. 79, l. 30.

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5. Claims 46-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakon et al. (US 5,077,142) in view of Schomaker et al. in *J. Org. Chem.*, Vol. 66, pp. 7125-7128 (2001), as applied to claims 46-53 above, and further in view of Fink et al. (US 6,352,791 B1).

Sakon et al. suggest pyrimidine compounds substituted with three phenyl groups wherein the phenyl group may be unsubstituted (when Ar is benzene) or substituted with a phenyl group (when Ar is biphenyl). Schomaker et al. describe a method by which aryl groups may be substituted on a pyrimidine ring at the 2, 4 and 6 positions.

Sakon et al. do not teach a terphenyl group for Ar as necessary to provide substituted pyrimidine compounds per applicant's originally elected species and within the scope of the compound required for the device of present claims 46-53 (e.g. as when the compound is a compound of formula IV as defined in claim 53 wherein each of  $W^3$ ,  $X^3$  and  $Y^3$  is biphenyl and all other variables are H). The closest compound within the scope of Sakon's general formula is a compound wherein B' is pyrimidine, m is 1, n is 3, Ar is biphenyl, and the Ar groups are at positions 2, 4 and 6 of the pyrimidine ring.

Fink et al. disclose compounds for use in an electroluminescent device wherein the compounds have a triazine ring substituted with aromatic substituents. Fink's compounds of formula (I) as shown in column 2 encompass compounds of Sakon's general formula wherein B' is triazine, m is 1, n is 3 and Ar is phenyl (benzene) or biphenyl (see the first and fifth formulae set forth for the R variables in col. 2 of the Fink patent). Fink et al. also teach that the three aromatic substituents on the triazine ring may be terphenyl groups (see the fourth formula set forth for the R variables in col. 2 of the Fink patent). Given Sakon's disclosure of aryl-

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substituted triazine and pyrimidine compounds for use in an electroluminescent device, and given Fink's disclosure of phenyl, biphenyl or terphenyl as suitable substituents to provide aryl-substituted triazine compounds for use in an electroluminescent device, it would have been an obvious modification to one of ordinary skill in the art at the time of the invention to make compounds similar to those of Sakon's general formula having pyrimidine for B', m is 1, n is 3, but having terphenyl, instead of phenyl (benzene) or biphenyl, for Ar. One of ordinary skill in the art would have reasonably expected that terphenyl-substituted compounds could be used for the same purpose as phenyl- or biphenyl-substituted compounds. Sakon's compounds are taught for use in a luminescent layer which may also function as an electron transporting layer, and Fink's compounds are taught for use in an electron-conducting layer that may also function as a light-emitting layer. Further, one of ordinary skill in the art at the time of the invention would have recognized that Schomaker's method could be modified to provide terphenyl groups, instead of phenyl groups, at the 2, 4 and 6 positions of pyrimidine.

6. Applicant's arguments filed June 04, 2010 have been fully considered but they are not persuasive.

Applicant argues that the light emitting layer and electron transport layer of the claimed device are clearly distinct because they are individually defined.

While independent claim 46 sets forth various functional layers that the claimed device comprises, the specification teaches that a single layer may provide the function of several layers (e.g. see page 35, lines 5-11). The specification also teaches that the compounds of the present

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invention function as light emitters that can also injection/transport holes and inject/transport electrons (p. 35, l. 20-26). A claim directed to an electroluminescent device comprising an electron transporting layer wherein the electron transporting layer comprises a compound of formula (I) was first set forth in the amendment filed September 01, 2009, as claim 54. The remarks accompanying that amendment indicated that support for claim 54 was provided in the specification at page 35, lines 23-26. The referenced portion of the specification supports a claim interpretation of a device in which light emitting layer c) also functions as electron transporting layer d). The examiner notes that the specification does not explicitly describe a device in which a compound of formula I is used in an electron transporting layer that is distinct from the light emitting layer.

7. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 7:00 a.m. to 3:30 p.m. Monday and Wednesday-Friday.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

/Marie R. Yamnitzky/  
Primary Examiner, Art Unit 1786

MRY  
August 02, 2010